ET-36

February 1935

A REVOLVING SCREEN TRAP FOR COLLECTING INSECTS [1]

By G. L. Smith, J. C. Clark, and A. L. Scales,
Division of Cotton Insect Investigations,
Bureau of Entomology and Plant Quarantine,
U. S. Department of Agriculture

Flight-screen traps have been used at the Tallulah, La., laboratory for a number of years for collecting cotton insects, especially the boll weevil, to determine their movement in cotton fields and between the fields and hibernation quarters. The traps originally used consisted of two 3-foot by 5-foot wooden frames covered with wire screen coated with sticky tree-banding material, which were nailed together to form a solid right-angle screen with exposures to the north, south, east, and west. Records made of the number of insects collected from each square foot of the surface area of these screens showed that a smaller number of insects were collected from the portions of these screen surfaces closest to their junction which formed the inside, or corner pocket, of the right angle. Since the sticky material when applied on these screens formed a solid surface through which air did not pass, it was apparent that an air pressure was built up in this right-angle inside corner pocket which had a tendency to deflect the insects therefrom, and to force them towards the outer ends of the screen. In recent years, to eliminate this uneven distribution of insects on the screen surfaces, these screen traps have been set up in the fields with the two frames some distance apart, one frame having a north-and-south surface exposure and the other an east-and-west surface exposure.

Records from these screen traps indicate that the greater number of insects were taken from the leeward surfaces; and to check this factor and eliminate complications due to changes in wind direction, a revolving screen trap with wind vane attached was designed and constructed. This trap has one surface always exposed to the windward, and the other to the leeward. Figure 1 illustrates this revolving screen trap set up in the field.

Construction

This apparatus consists of a weather vane and a double screen so mounted on a stand that they will revolve freely and at the same time remain perpendicular to each other. In this way the screen will always face the wind. The three main parts are the stand, the double screen, and the vane with its support. Detail drawings are shown in figure 2.

The stand has a stem of $1\frac{1}{2}$-inch tubing to which are welded at its base three horizontal legs of $\frac{5}{8}$-inch tubing spaced 120 degrees apart. Braces of $\frac{5}{8}$-inch tubing are welded to the legs 4 inches from the outer ends and to the stem 34 inches from the bottom. The stand is anchored in place by clamping

---

[1] Designed and constructed by M. D. Kearney, machinist, Tallulah, La. Drawing by W. P. Gill, Bureau of Agricultural Engineering.

each leg near its outer end to a $\frac{3}{4}$-inch rod 24 inches long, which has been driven 20 inches into the ground. The top of the stem is fitted with a bushing having a conical hole $\frac{3}{4}$ inch in diameter at the top and $\frac{1}{2}$ inch deep. This forms the female part of the bearing which allows the screens to revolve freely.

The two screens are 30 inches wide by 36 inches high and are made of 8 by 8 mesh hardware wire cloth. The edges of the screens are clamped to a rectangular frame made of $\frac{1}{2}$-inch tubing welded at the corners. A metal strip $\frac{3}{4}$ inch wide with $\frac{1}{4}$-inch round-head stove bolts spaced 4 inches apart serves as the clamp. The screens are welded to opposite sides of a tube 2 inches outside diameter and $1\frac{3}{4}$ inches inside diameter by $36\frac{1}{2}$ inches long. In the top of this tube there is a bushing which forms the male part of the bearing about which the screen revolves. The bushing has a conical point to fit the bushing described in connection with the stand. The top of the bushing has a standard $\frac{3}{4}$-inch pipe thread.

The vane support is of $\frac{3}{4}$-inch pipe and is attached to the top screen bushing by a coupling. The arrow and tail of the vane are made of sheet metal and are attached to the ends of a $\frac{3}{4}$-inch pipe 7 feet and 1 inch long. One end of the pipe is slotted 20 inches to receive the tail of the vane, which is secured by stove bolts. The other end is welded to the arrow. The tail end of the horizontal pipe is $50\frac{3}{4}$ inches from the center support and the arrow end is $34\frac{1}{4}$ inches from the center support. The vane is braced by two $\frac{1}{4}$-inch tubes welded to the horizontal member $27\frac{1}{4}$ inches from the support and to the support 12 inches from the horizontal member.

When the stand, screens, and vane are assembled, the coupling is screwed up tight so as to keep the vane and the screens perpendicular to each other. In this way, with both the vane and screens revolving together freely, the screens are always perpendicular to the wind.

Operation

The screen base and support should be set up in the field with the support shaft exactly perpendicular, with the aid of a spirit level. The female bearing in the top of the support should be filled with lubricating oil. The screen frame, with sleeve holding the male bearing, is slipped on the support shaft until the male bearing seats into the female bearing. The wind vane is then put in place above the screen by screwing the coupling onto the threads at the top of the male bearing.

Three of these revolving screen traps have been in use at Tallulah for two years and are still in perfect operating condition. It may be found necessary to apply a little cup grease to the bottom bearing once or twice a year, but the top bearing is self-oiling. In case the screens are to be moved often, the base supports and braces may be fastened to the center shaft by bolts instead of welding, which will facilitate handling for moving. In the construction of this screen trap standard metal piping may be used throughout, in place of tubing.

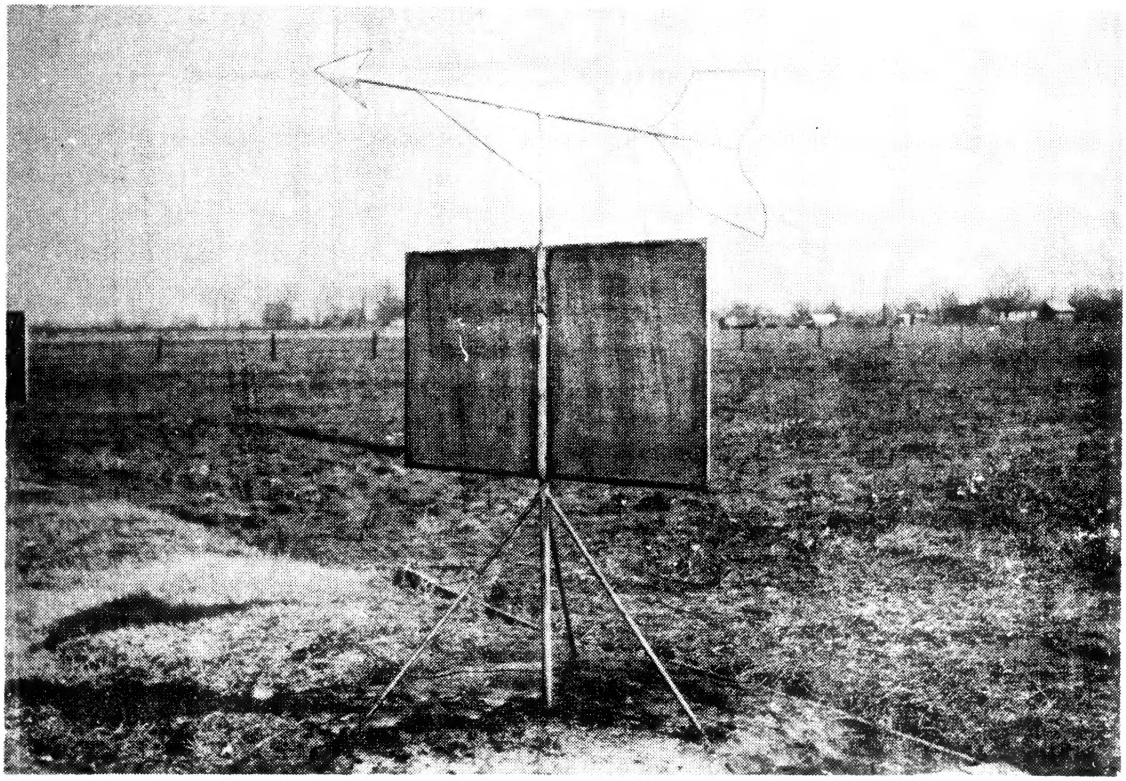

Figure 1.-Revolving single-frame screen trap.

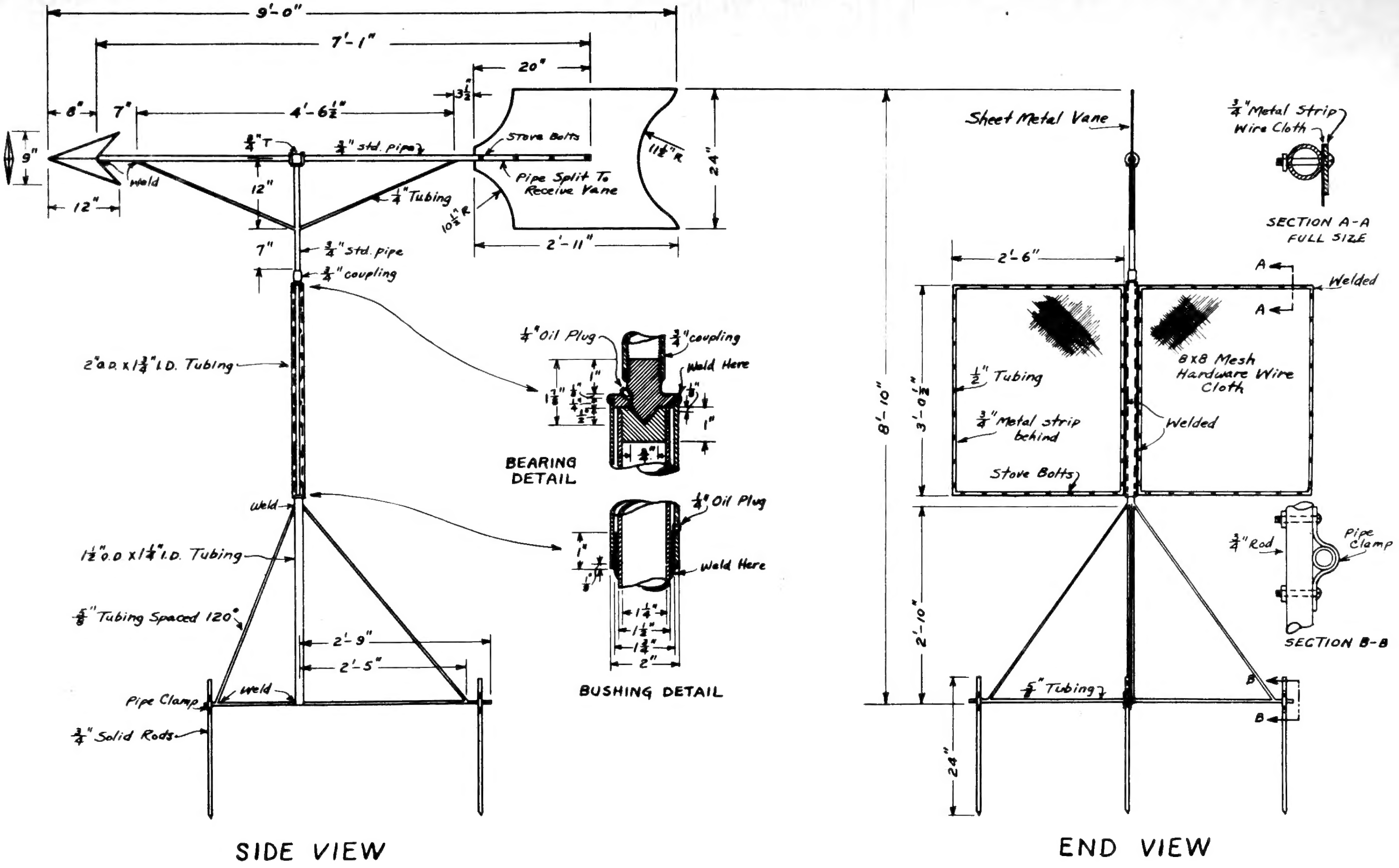

Figure 2.- Detail drawing of revolving screen trap

DESIGNED BY: M. B. KEARNEY
DRAWN BY: WILSON P. GILL,
DATE: 4-25-34